Homework 1

May 6, 2024

Please provide short answers! Bullet points are also accepted as answer.

Hand in until Monday, May 20 (16:00)

Task 1: Negative Emission Technologies

After having introduced emissions into the basic model, we want to include technologies which have negative emissions. Examples could be Direct Air Capture (DAC) which extracts carbon dioxide from the atmosphere or power plants which burn biomass and capture the emissions, resulting in a net-negative emission technology.

Your task is to include the option of having negative emissions through Biomass-CCS (Carbon Capture and Storage). Two technologies are required: the biomass power plant as well as a technology which provides the necessary biomass (similar to the gas extractor). You can find the details about both technologies in the following table.

Parameter	BiomassGenerator	BECCS
VariableCost	1	0
InvestmentCost	0.5	1
OutputRatio (Fuel)	1 (Biomass)	1 (Power)
InputRatio (Fuel)	None	2 (Biomass)
EmissionRatio	None	-1
MaxCapacity	20	Infinite

- You have to include all new technologies and fuels into the respective files
- Add the technology parameters to the necessary files
- Set the emission limit to 20
- Describe the resulting energy system. You should mention: the new objective value as well as how much biomass is generated.
- Hint: You might have to reconsider the domain of your "TechnologyEmissions[t]" Variable.